That which is claimed is:

1. A process for purification of an olefin stream to obtain a feedstock suitable for formation of olefin polymers, which purification process comprises:

providing an impure gaseous mixture comprising at least one olefin of from 2 to about 8 carbon atoms, acetylenic impurities having the same or similar carbon content in an amount of up to about 1 percent by volume based upon the total amount of olefin present and optionally saturated hydrocarbon gases;

passing the impure mixture through a bed of regenerated adsorbent which is free of a substantial amount of carbon monoxide, the adsorbent comprising predominantly a support material having high surface area on which is dispersed at least one metallic element in the zero valent state selected from the group consisting of chromium, iron, cobalt, nickel, copper, ruthenium, palladium, silver and platinum, to effect, under conditions suitable for adsorption within the bed, selective adsorption and/or complexing of the contained acetylenic contaminants with the adsorbent, and thereby obtain an effluent mixture which contains less than about 1 part per million by volume of the acetylenic impurities and an amount of carbon monoxide less than is deleterious to formation of olefin polymers; and

thereafter regenerating the resulting bed of adsorbent in the presence of a reducing gas comprising dihydrogen which is free of a substantial amount of carbon monoxide, to effect release of the contained acetylenic impurities from the adsorbent

2. The process according to claim 1 wherein the gaseous mixture, while passing through the bed, is at temperatures in a range downward from about 20°C to about negative 35°C.

3. The process according to claim 1 wherein the reducing gas comprises at least 25 percent dihydrogen, less than 0.5 parts per million carbon monoxide, and optionally saturated hydrocarbon and/or inert gases.

4. The process according to claim 1 wherein the support is a material selected from the group consisting of alumina, silica, active carbon, clay and zeolites, and has surface area in a range of from about 10 to about 2,000 square meters per gram as measured by the BET gas adsorption method.

5. The process according to claim 1 wherein the gaseous mixtures pass though the beds of adsorbent at gas hourly space velocities in a range of from about 0.05 $hours^{-1}$ to about 20,000 $hours^{-1}$ measured at standard conditions of 0°C and 760 mm Hg.

6. The process according to claim 1 wherein the adsorbent comprises at least about 90 weight percent of a gamma alumina having surface area in a range of from about 80 to about 500 square meters per gram as measured by the BET gas adsorption method, and contains less than 500 parts per million by weight of a sulfur-containing component, calculated as elemental sulfur.

7. The process according to claim 6 wherein the metal dispersed on the support material is palladium, and the absorbent has a palladium content in a range of from about 0.01 to about 10 percent based on the total weight of the adsorbent.

8. The process according to claim 1 wherein the olefin in the gaseous mixture being purified is predominantly ethylene or propylene, the gaseous mixture contains less than about 0.5 parts per million by volume of dihydrogen and less than about 1 parts per million by volume of mercury-containing, arsenic-containing, and sulfur-containing components,

9. The process according to claim 8 wherein the adsorbent comprises at least about 90 weight percent of a gamma alumina having surface area in a range of from about 150 to about 350 square meters per gram as measured by the BET gas adsorption method, and wherein the metal dispersed on the support material is palladium, and the absorbent has a palladium content in a range of from about 0.01 to about 10 percent based on the total weight of the adsorbent.

10. The process according to claim 9 wherein the gaseous mixture, while passing through the bed, is at temperatures in a range downward from about 20°C to about minus 35°C.

11. A process for purification of olefins produced by thermal cracking of hydrocarbons to obtain a feedstock suitable for formation of olefin polymers, which purification process comprises:

providing an impure gaseous mixture comprising at least about 99 percent by volume of an olefin having from 2 to about 4 carbon atoms, and acetylenic impurities having the same or similar carbon content in an amount in a range upward from about 1 to about 1000 parts per million by volume based upon the total amount of olefin present and optionally saturated hydrocarbon gases;

passing the impure mixture through a bed of regenerated adsorbent which is free of a substantial amount of carbon monoxide, the adsorbent comprising predominantly a support material selected from the group alumina, silica, active carbon, clay and zeolites having surface area in a range of from about 10 to about 2,000 square meters per gram as measured by the BET gas adsorption method, on which is dispersed at least one metallic element in the zero valent state selected from the group consisting of chromium, iron, cobalt, nickel, copper, ruthenium, palladium, silver and platinum, to effect, under conditions suitable for adsorption within the bed, selective adsorption and/or complexing of the contained acetylenic contaminants with the adsorbent;

effecting, in the presence of an essentially dihydrogen-free atmosphere within the bed, selective adsorption and/or complexing of the contained acetylenic impurities with the adsorbent, until levels of the acetylenic impurities in the effluent mixture increase to a limiting level in a range downward from about 1 parts per million by volume; and

thereafter regenerating the resulting bed of adsorbent in the presence of a reducing gas comprising dihydrogen which reducing gas is free of a substantial amount of carbon monoxide,

to effect release of the contained acetylenic impurities from the adsorbent.

12. The process according to claim 11 wherein the gaseous mixture, while passing through the bed, is at temperatures in a range downward from about 5°C. to about negative 35°C.

13. The process according to claim 11 wherein the reducing gas comprises less than 0.1 parts per million carbon monoxide, and at least 90 percent dihydrogen.

14. The process according to claim 11 wherein the adsorbent has a metal dispersion value in a range upward from about 20 percent to about 80 percent as measured by carbon monoxide chemisorption method.

15. The process according to claim 11 wherein the gaseous mixture passes though the bed of particulate adsorbent at gas hourly space velocities in a range of from about 0.05 hours^{-1} to about 20,000 hours^{-1} measured at standard conditions of 0°C and 760 mm Hg.

16. The process according to claim 11 wherein the adsorbent comprises at least about 90 weight percent of a gamma alumina having surface area in a range of from about 80 to about 500 square meters per gram as measured by the BET gas adsorption method, and contains less than 500 parts per million by weight of a sulfur-containing component, calculated as elemental sulfur.

17. The process according to claim 16 wherein the metal dispersed on the support material is palladium, and the absorbent has a palladium content in a range of from about 0.01 to about 10 percent based on the total weight of the adsorbent.

18. The process according to claim 17 wherein the olefin in the gaseous mixture being purified is predominantly ethylene or propylene, the gaseous mixture contains less than about 0.5

parts per million by volume of hydrogen and less than about 1 parts per million by volume of mercury-containing, arsenic-containing, and sulfur-containing components, each calculated as the element, and wherein the gaseous mixture, while passing through the bed, is at temperatures in a range of from about negative 35°C to about 5°C.

19. A process for purification of a predominantly ethylene stream to obtain a feedstock suitable for formation of polymer, which purification process comprises:

providing an impure gaseous stream comprising at least about 95 percent by volume of ethylene, and acetylene in an amount in a range upward from about 1 to about 1000 parts per million by volume based upon the total amount of ethylene present and optionally saturated hydrocarbon gases;

passing the impure stream through a bed of adsorbent which is free of a substantial amount of carbon monoxide, the adsorbent comprising at least about 90 weight percent of gamma alumina having surface area in a range of from about 150 to about 350 square meters per gram as measured by the BET gas adsorption method, on which is dispersed is at least one element selected from the group consisting of iron, cobalt, nickel, copper, palladium, silver and platinum, in the zero valent state, to effect, under conditions suitable for adsorption within the bed, selective adsorption and/or complexing of the contained acetylene contaminant with the adsorbent, thereby obtain an effluent steam of feedstock which contains less than about 0.5 parts per million by volume of carbon monoxide and less than about 1 parts per million by volume of the acetylene and;

effecting, in the presence of an essentially dihydrogen-free atmosphere within the bed, selective adsorption and/or complexing of the contained acetylene with the adsorbent, until levels of the acetylene in the effluent stream increase to a limiting level in a range downward from about 1 parts per million by volume; and

thereafter regenerating the resulting bed of adsorbent in the presence of a reducing gas comprising dihydrogen which

reducing gas is free of a substantial amount of carbon monoxide, to effect release of the contained acetylene from the adsorbent.

20. The process according to claim 19 wherein the adsorbent comprises at least about 90 weight percent of a gamma alumina having surface area in a range of from about 150 to about 350 square meters per gram as measured by the BET gas adsorption method, the metal dispersed on the support material is palladium, and the absorbent has a palladium content in a range of from about 0.01 to about 10 percent based on the total weight of the adsorbent, and wherein the gaseous mixture, while passing through the bed, is at temperatures in a range of from about negative 35°C to about 5°C.